

REMARKS

The above amendments are submitted within the three-month period for response to the Final Office Action mailed September 13, 2006 and in connection with a Request for Continued Examination (RCE). Authorization to charge the \$790.00 requisite fee is hereby included in the Electronic Fee Sheet attached. Reconsideration and allowance of all pending claims are respectfully requested.

In the subject Office Action, claims 1-13 and 15-23 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,560,007 to Thai. Moreover, claim 14 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Thai further in view of U.S. Patent No. 6,757,670 to Inohara et al.

Applicants respectfully traverse the Examiner's rejections to the extent that they are maintained. Applicants have amended claims 1, 7, 15 and 19 herein, and Applicants respectfully submit that no new matter is being added by the above amendments, as the amendments are fully supported in the specification, drawings and claims as originally filed.

As an initial matter, Applicants wish to thank the Examiner for the consideration extended in the telephonic interview conducted between the Examiner and Applicants' representative on August 24, 2006. In the interview, proposed amendments to the claims were discussed, as well as the Examiners' bases for rejection on several of the dependent claims.

Now turning to the subject Office Action, and in particular to the rejection of independent claim 1, the Examiner will note that this claim has been amended to additionally recite that (1) selectably setting respective elements that are associated with entries that do not satisfy the portion of the query to an inactive value includes setting a respective element associated with a first table entry that does not satisfy the portion of the query to the inactive value prior to retrieving the first table entry in connection with executing the query using the bitmap; and (2) executing the query includes avoiding retrieval of the first table entry when executing the query using the bitmap after the respective element associated with the first table entry is set to the inactive value. Support for the first feature may be found, for example, at page 17, lines 6-9 of the

specification, while support for the second feature may be found, for example, at page 16, lines 22-25.

Claim 1 therefore recites an instance where an element associated with a table entry is set to an inactive value before that table entry is retrieved using the bitmap during execution of the query, and where retrieval of that table entry is then avoided after the element is set to the inactive value. Put another way, the table entry is never retrieved using the bitmap during execution of a query because its associated element is set to an inactive value.

In rejecting claim 1, the Examiner relies on Thai, and in particular, the disclosure at cols. 9 and 10, as well as the disclosure at cols. 19-21 relating to Figs. 5A-5D. As disclosed at columns 9 and 10 of Thai, as well as at column 4, lines 21-32, Thai is capable of building a bitmap using "on-the-fly learning", whereby as records are retrieved and compared against a filter condition, the associated elements in the bitmap are changed to "0" values to eliminate those records from further consideration. The results of the learning mode of Thai, however, are not used on a current query, since the decision to set elements in a bitmap to "0" values is made as the associated records have already been retrieved. It is only after the bitmap is completely constructed, and a later query attempts to use the same bitmap, that the benefits of the learning mode are realized.

Another embodiment of Thai, illustrated in Figs. 5A-5D, and described in cols. 19-21, is perhaps more pertinent. In this embodiment, a multi-user/multi-tasking environment is described. In addition, the embodiment describes a user switching to different views, or ranges of records, within a database table. As described specifically at col. 20, lines 34-58, and shown in Figs. 5C-5D, a user views at time T0 a first set of records, and at T1, these records are retrieved and the bitmap is updated to filter out non-matching records. Of note, the bitmap is updated as a result of the retrieval of these records. Then, the user jumps to another range of records at time T2, and the same processing is used at time T3 to filter out non-matching records. Then, at time T4, the user jumps back to the first range of records, which as a result of the prior updating of the bitmap as a result of the earlier retrieval of all of these records, enables some of the records to not be retrieved based upon the bitmap.

Applicants submit, first, that the return of a user to a prior-visited range of records, as shown in Fig. 5D, is not the same query, but is in essence a new query. Under such an interpretation, Thai does not anticipate claim 1, because the reference does not disclose accessing the bitmap before at least one element is set to an inactive value during generation of the bitmap, since the second query in Thai is not processed until after the bitmap has already been generated.

Second, even if the Examiner takes the position that the return of a user to a prior-visited range of records constitutes the same query, Thai still does not anticipate claim 1. In particular, claim 1 as amended now recites "setting a respective element associated with a first table entry that does not satisfy the portion of the query to the inactive value prior to retrieving the first table entry in connection with executing the query using the bitmap." If the two views of a range of records are considered to constitute the same query, Thai only discloses that an element in a bitmap for a record is set to an inactive value after that record has been retrieved using the bitmap. As stated by Thai at col. 20, lines 36-38, "as each record is actually read, the system "learns" which records truly meet the filter condition."

Thai does not disclose that, within any given query, an element in a bitmap corresponding to a record or table entry is set to an inactive value prior to the corresponding record or table entry being retrieved using the bitmap, and that as a result of that element being set to the inactive value, retrieval of the record or table entry using the bitmap is avoided.

Accordingly, claim 1 is novel over Thai.

Applicants also respectfully submit that claim 1 is non-obvious over Thai, as claim 1 is directed to an invention that provides unique and unexpected advantages over Thai and the other prior art of record. In particular, as noted above, Thai requires that a record actually be retrieved using the bitmap before its corresponding element can be set to an inactive value. In contrast, claim 1 enables the elements in a bitmap corresponding to some records or table entries to be set to inactive values prior to those records or table entries ever being retrieved using the bitmap. This features is neither disclosed nor suggested by Thai, and furthermore, no evidence has been presented that establishes that

one of ordinary skill in the art would be motivated to modify Thai to incorporate any such functionality. Accordingly, claim 1 is also non-obvious over Thai, and is thus patentable over the prior art of record. Reconsideration and allowance of claim 1, as well as of claims 2-6 which depend therefrom, are therefore respectfully requested.

Next turning to the rejection of independent claim 7, this claim has been amended to clarify that the first and second tasks are associated with the same query, support for which may be found, for example, at page 13, lines 25-28 of the specification.

The Examiner appears to be of the opinion that Thai, and in particular, col. 20, lines 60-61 necessarily discloses the use of concurrent tasks to respectively use and generate a bitmap. Col. 20, lines 60-61 discusses "updating bitmaps while retrieving records." However, as described above in connection with claim 1, the embodiment described by this passage (shown in Figs. 5A-5D) does in fact update bitmaps while retrieving records, but does so in a way that does not rely on multiple current tasks. There is otherwise no disclosure or suggestion in the reference that multiple tasks could be used for these different operations.

What the passage is actually describing is the fact that the first time a record is retrieved, the bitmap entry for that record is updated, such that subsequent attempts to retrieve that record can be avoided (e.g., as shown in Figs. 5C and 5D). This operation is accurately described as "updating bitmaps while retrieving records," since the bitmap is being updated as records are being retrieved. Such an operation, however, does not require separate tasks to be used, and indeed, there is no disclosure or suggestion in the reference that separate tasks could or should be used for this operation.

The only reference to multiple tasks in Thai is found at col. 19, line 58 to col. 20, line 13. It is clear from this passage, however, that the multiple tasks are all tasks that are being used for separate queries. The passage describes checking for whether other tasks are accessing the same tables or files; however, there is no discussion of the fact that multiple tasks can be used for the same query, and that one task can be used to retrieve records for the query while another task updates a bitmap used by that query.

As noted above, claim 7 has been amended to clarify that the first and second tasks are associated with the same query, a feature that is neither disclosed nor suggested

by Thai. Accordingly, Applicants submit that claim 7 is novel and non-obvious over Thai and the other prior art of record. Reconsideration and allowance of claim 7, as well as of claims 8-14 which depend therefrom, are therefore respectfully requested.

Next turning to independent claim 15, this claim has been amended in a similar manner to claim 1, and as such, is patentable over Thai for the same reasons as presented above for claim 1. Reconsideration and allowance of claim 15, and of claims 16-18 which depend therefrom, are therefore respectfully requested.

Next turning to independent claim 19, this claim has been amended to clarify that the database engine is configured to (1) set a first individual element associated with a first record that does not satisfy the portion of the query to an inactive value without retrieving the first record, and (2) avoid retrieval of the first record when retrieving records of the table according to the bitmap after the first individual element associated with the first record is set to the inactive value. Support for this amendment may be found, for example, at page 12, lines 11-13, page 16, lines 22-25, and page 17, lines 6-9 of the specification.

As discussed in the aforementioned passages, the setting of elements in a bitmap to inactive values can be performed, for example, using an index, and thus without actually having to retrieve the records associated with those elements. As noted above in connection with claim 1, however, Thai discloses that bitmap elements are set upon the initial retrieval of those records from the database. Thai specifically discloses at col. 20, lines 36-38, that "as each record is actually read, the system "learns" which records truly meet the filter condition." Thai does not disclose any embodiment where the updating of a bitmap is a separate operation from the retrieval of records. In fact, the updating of a bitmap is performed specifically based upon the retrieval of records.

As such, Applicants submit that claim 19 is novel over Thai. Furthermore, given that neither Thai, nor any of the other art of record, suggests such a modification to Thai, Applicants submit that no *prima facie* case of obviousness can be made against claim 19. Among other benefits, the invention of claim 19 potentially enables a bitmap to be constructed dynamically during a query with certain records never having to have been retrieved, thus saving the input/output costs that would otherwise be required in Thai to

retrieve those records at least one time. Reconsideration and allowance of claim 19, and of claims 20-23 which depend therefrom, are therefore respectfully requested.

As a final matter, Applicants traverse the Examiner's rejections of the dependent claims based upon their dependency on the aforementioned independent claims. Nonetheless, Applicants note that a number of these claims recite additional features that further distinguish these claims from the references cited by the Examiner. In the interest of prosecutorial economy, however, these claims will not be separately addressed herein.

In summary, Applicants respectfully submit that all pending claims are novel and non-obvious over the prior art of record. Reconsideration and allowance of all pending claims are therefore respectfully requested. If the Examiner has any questions regarding the foregoing, or which might otherwise further this case onto allowance, the Examiner may contact the undersigned at (513) 241-2324. Moreover, if any other charges or credits are necessary to complete this communication, please apply them to Deposit Account 23-3000.

Respectfully submitted,

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Date

/Scott A. Stinebruner/
Scott A. Stinebruner
Reg. No. 38,323
WOOD, HERRON & EVANS, L.L.P.
2700 Carew Tower
441 Vine Street
Cincinnati, Ohio 45202
Telephone: (513) 241-2324
Facsimile: (513) 241-6234